

I Claim:

1. A photopolymer data recording media for holographic imaging and data storage, comprising:
 - (a) a substrate layer;
 - (b) a capping layer; and
 - (c) a photopolymerizable layer between the substrate layer and the capping layer, wherein the photopolymerizable layer comprises a photopolymerizable material including at least:
 - (1) an actinic monomer,
 - (2) a polyurethane binder comprising the reaction product of:
 - (A) a polyisocyanate having at least two reactive isocyanate groups pendant from a primary carbon atom and a viscosity of less than about 1,000 mPa·s, and
 - (B) a polyol, and
 - (3) a photosensitive initiator.
2. The photopolymer data recording media of claim 1 wherein the substrate layer and capping layer are individually comprised of glass or plastic which is transparent to that electromagnetic radiation to which the photopolymerizable material is sensitive.
3. The photopolymer data recording media of claim 1 wherein the actinic monomer is an actinic acrylate monomer.
4. The photopolymer data recording media of claim 3 wherein the acrylate monomer is a brominated phenylacrylate.

5. The photopolymer data recording media of claim 3 wherein the brominated phenylacrylate is selected from the group consisting of tribromophenylacrylate and pentabromophenylacrylate.

6. The photopolymer data recording media of claim 1 wherein the polyisocyanate is an aliphatic polyisocyanate.

7. The photopolymer data recording media of claim 5 wherein the aliphatic polyisocyanate is a dimer or trimer of 1,6 hexamethylene diisocyanate.

8. The photopolymer data recording media of claim 1 wherein the polyol has a viscosity of about 1,000 to 5,000 cps.

9. The photopolymer data recording media of claim 1 wherein the photopolymerizable material includes at least:

- (a) about 3 to 5 wt% actinic monomer;
- (b) about 95 to 97 wt% polyurethane binder; and
- (c) an effective amount of photosensitive initiator.

10. A method for holographically imaging a photopolymer data recording media, comprising:

- (a) obtaining a photopolymer data recording media, including at least:
 - (1) a substrate layer;
 - (2) a capping layer; and
 - (3) a photopolymerizable layer between the substrate layer and the capping layer, the photopolymerizable layer comprising a photopolymerizable material including at least:
 - (A) an actinic monomer,
 - (B) a polyurethane binder comprising the reaction product of:

- (i) a polyisocyanate having at least two reactive isocyanate groups pendant from a primary carbon atom, and a viscosity of less than about 1,000 mPa·s, and
 - (ii) a polyol, and
- (4) a photosensitive initiator,

- (b) creating an interference pattern by interfering a data beam and a reference beam, wherein the data beam contains an information pattern and the data beam and reference beam are comprised of electromagnetic radiation to which the photopolymerizable material is sensitive; and
- (c) recording the interference pattern on the photopolymer data recording media in a pattern representative of the information pattern by exposing the photopolymerizable material to the interference pattern for a time sufficient to effect photopolymerization of the photopolymerizable material.

11. The method of claim 10 wherein the substrate layer and capping layer are individually comprised of glass or plastic which is transparent to that electromagnetic radiation to which the photopolymerizable material is sensitive.

12. The method of claim 10 wherein the actinic monomer is an actinic acrylate monomer.

13. The method of claim 12 wherein the acrylate monomer is a brominated phenylacrylate.

14. The method of claim 13 wherein the brominated phenylacrylate is selected from the group consisting of tribromophenylacrylate and pentabromophenylacrylate.

15. The method of claim 10 wherein the polyisocyanate is an aliphatic polyisocyanate.

16. The method of claim 15 wherein the aliphatic polyisocyanate is a dimer or trimer of 1,6 hexamethylene diisocyanate.

17. The method of claim 10 wherein the photopolymerizable material includes at least:

- (a) about 3 to 5 wt% actinic monomer;
- (b) about 95 to 97 wt% polyurethane binder; and
- (c) an effective amount of photosensitive initiator.

18. A method for reading a holographically imaged photopolymer data recording media, comprising:

- (a) obtaining a holographically imaged photopolymer data recording media, including at least:
 - (1) a substrate layer,
 - (2) a capping layer, and
 - (3) a photopolymerizable layer between the substrate layer and the capping layer, the photopolymerizable layer comprising a photopolymerizable material including at least:
 - (A) an actinic monomer,
 - (B) a polyurethane binder comprising the reaction product of:
 - (i) a polyisocyanate having at least two reactive isocyanate groups pendant from a primary carbon atom, and a viscosity of less than about 1,000 mPa·s, and
 - (ii) a polyol, and
 - (C) a photosensitive initiator,
- (b) wherein the photopolymerizable layer includes at least one recorded page of information recorded by differential interference pattern polymerization of the actinic monomer within pixels on the page so as to produce a page having pixels with different diffractive values;
- (c) obliquely focusing a reference beam upon a selected page recorded on the data recording media; and

(d) detecting presence or absence of the reference beam transmitted through the individual pixels of the page at a preselected angle of diffraction.

19. The method of claim 18 wherein the substrate layer and capping layer are individually comprised of glass or plastic which is transparent to that electromagnetic radiation to which the photopolymerizable material is sensitive.

20. The method of claim 18 wherein the actinic monomer is an actinic acrylate monomer.

21. The method of claim 20 wherein the acrylate monomer is a brominated phenylacrylate.

22. The method of claim 21 wherein the brominated phenylacrylate is selected from the group consisting of tribromophenylacrylate and pentabromophenylacrylate.

23. The method of claim 18 wherein the polyisocyanate is an aliphatic polyisocyanate.

24. The method of claim 23 wherein the aliphatic polyisocyanate is a dimer or trimer of 1,6 hexamethylene diisocyanate.

25. The method of claim 18 wherein the photopolymerizable material includes at least:

- (a) about 3 to 5 wt% actinic monomer;
- (b) about 95 to 97 wt% polyurethane binder; and
- (c) an effective amount of photosensitive initiator.